HD1761
G6
#73

University of California
College of Agriculture
Agricultural Experiment Station
Berkeley, California

STATISTICAL ANALYSIS OF THE ANNUAL AVERAGE F.O.B. PRICES OF PACIFIC COAST CANNED BARTLETT PEARS, 1926-27 TO 1939-40

by

H. R. Wellman and R. S. Bylin

August 1940

Contribution from the
Giannini Foundation of Agricultural Economics
Mimeographed Report No. 73

UNIVERSITY OF CALIFORNIA
LIBRARY
COLLEGE OF AGRICULTURE
DAVIS

STATISTICAL ANALYSIS OF THE ANNUAL AVERAGE F.O.B. PRICES OF PACIFIC COAST CANNED BARTLETT PEARS, 1926-27 TO 1939-40

H. R. Wellman[1] and R. S. Bylin[2]

Pacific Coast canners received higher prices for canned Bartlett pears in 1939-40 than in any year since 1930-31. The annual average f.o.b. price of canned pears in 1939-40 was $3.27 a case, as compared with $2.77 a case in 1938-39 and an average of $2.83 a case for the eight years 1931-32 to 1938-39.

Among the conditions favorable to higher prices on canned pears in 1939-40 than in 1938-39 were (1) a reduction in the supply of canned pears available for shipments, (2) an increase in the buying power of domestic consumers, and (3) an advance in the prices of canned apricots, canned peaches and canned pineapples.

The total quantity of Pacific Coast canned pears available for shipment in 1939-40 amounted to 4,457,000 cases as against 5,240,000 cases in 1938-39. This decrease of 783,000 cases is accounted for chiefly by the reduction in carryover from 1,150,000 cases on June 1, 1938, to 400,000 cases on June 1, 1939. The pack of 1939 was only slightly smaller than that of 1938; 4,057,000 cases as against 4,090,000 cases.

The monthly indexes of nonagricultural income payments in the United States during 1939-40 averaged 94.5, 5.3 points higher than in the previous year. There was a steady rise in the index during the months of June through December 1939, followed by a small decline during the first four months of 1940.

Prices of the major canned fruits which compete with canned pears were all higher in 1939-40 than in 1938-39. Canned apricots were up 9 per cent, canned peaches 6 per cent, and canned pineapples 5 per cent.

Total United States exports of canned pears in 1939-40 amounted to 1,409,000 cases as against 1,726,000 cases in 1938-39, a decrease of 18 per cent. Most of this decrease is accounted for by the higher selling prices of canned pears rather than by the European war. It was not until May 1940 that shipments of canned fruits abroad were seriously curtailed.

The loss in exports of canned pears was not, however, sufficient to offset the reduction in the total supply available for shipment. Consequently domestic movement was reduced. Only 2,767,000 cases of canned pears were moved into domestic markets in 1939-40, as against 3,114,000 cases in 1938-39, and to obtain even that volume it was necessary to reach into the carryover to

---

1/ Professor of Agricultural Economics, Agricultural Economist in the Experiment Station, and Agricultural Economist on the Giannini Foundation.

2/ Research Assistant on the Giannini Foundation.

STATISTICAL ANALYSIS OF THE ANNUAL AVERAGE F.O.B. PRICES OF

PACIFIC COAST CANNED BARTLETT PEARS, 1919-47 TO 1939-40

H. P. Wellman[1] and R. S. Kyle[2]

Pacific Coast canners received higher prices for canned Bartlett pears in 1939-40 than in any year since 1930-31. The annual average f.o.b. price of canned pears in 1939-40 was $2.22 a case, as compared with $2.44 a case in 1938-39 and an average of $2.38 a case for the eight years 1931-32 to 1938-39.

Among the conditions favorable to higher prices on canned pears in 1939-40 than in 1938-39 were (1) a reduction in the supply of canned pears available for shipment, (2) an increase in the buying power of domestic consumers, and (3) an increase in the prices of canned apricots, canned peaches and canned pineapples.

The total quantity of Pacific Coast canned pears available for shipment in 1939-40 amounted to 6,481,000 cases as against 8,240,000 cases in 1938-39. This decrease of 759,000 cases is accounted for chiefly by the reduction in carryover from 1,210,000 cases on June 1, 1939, to 600,000 cases on June 1, 1940. The pack of 1939 was only slightly smaller than that of 1938; 6,087,000 cases as against 6,040,000 cases.

The monthly increase of nonagricultural income payments in the United States during 1939-40 averaged 86.6, 2.6 points higher than in the previous year. There was a steady rise in the index during the months of June through December 1939, followed by a small decline during the first four months of 1940.

Prices of the major canned fruits which compete with canned pears were all higher in 1939-40 than in 1938-39. Canned apricots were up 8 per cent, canned peaches 6 per cent, and canned pineapples 8 per cent.

Total United States exports of canned pears in 1939-40 amounted to 1,406,000 cases as against 1,256,000 cases in 1938-39, a decrease of 12 per cent. Most of this decrease is accounted for by the higher selling prices of canned pears rather than by the European war. It was not until May 1940 that shipments of canned fruits showed more seriously curtailed.

The loss in exports of canned pears was not, however, sufficient to offset the reduction in the total supply available for shipment. Consequently domestic movement was reduced. Only 5,747,000 cases of canned pears were moved into domestic markets in 1939-40, as against 7,116,000 cases in 1938-39, and to obtain even that volume it was necessary to reach into the carryover

---

[1] Professor of Agricultural Economics, Agricultural Experiment Station, and Agricultural Economist on the Giannini Foundation.

[2] Research Assistant on the Giannini Foundation.

the extent of 120,000 cases. Stocks of canned pears in canners' hands were smaller on June 1, 1940, than on June 1 of any of the previous five years.

In the statistical analysis presented herein the annual average f.o.b. prices received for canned Bartlett pears by canners on the Pacific Coast from 1926-27 to 1938-39 were correlated with three factors: (1) domestic shipments of canned pears, (2) index of nonagricultural income payments in the United States, and (3) adjusted index of prices of competing canned fruits.

The linear relations between the f.o.b. prices and each of the three factors mentioned above are shown graphically by the diagonal lines in figure 1. Expressed in numerical terms these relations are as follows: (a) With both the index of nonagricultural income and the adjusted index of prices of competing canned fruits held constant, a change of one million cases in the domestic shipments of canned pears was on the average accompanied by a change in the opposite direction of 30 cents a case in the f.o.b. price of canned pears; (b) with both domestic shipments and adjusted index of prices of competing canned fruits held constant, a change of 10 points in the index of nonagricultural income was on the average accompanied by a change in the same direction of 50 cents a case in the f.o.b. price of canned pears; and (c) with both domestic shipments of canned pears and the index of nonagricultural income held constant, a change of 10 points in the adjusted index of prices of competing canned fruits was on the average accompanied by a change in the same direction of 35 cents a case in the f.o.b. price of canned pears.

Differences between the actual prices and those accounted for by the correlation analysis are given in table 2, column 3. These differences are plotted as deviations from the regression line in figure 1, section C.

Data for the year 1939-40, although not included in the observations upon which the average relationships are based, are shown in the chart and tables. The actual f.o.b. price of canned pears in 1939-40 was 18 cents a case above that expected on the basis of the correlation analysis. In three of the previous 13 years the differences between the actual and estimated prices were larger than 18 cents a case, while in the other 10 years they were smaller.

Mathematical Note.-- With price as the dependent variable and the three factors mentioned above as the independent variables, the multiple linear regression equation fitted by the method of least squares to the series covering the years 1926-27 through 1938-39 is

$$X_1 = -3.41687 - 0.30491\,X_2 + 0.05000\,X_3 + 0.03478\,X_4$$
$$\qquad\qquad (0.10348) \qquad (0.00436) \qquad (0.00755)$$

Where X_1 is the annual average f.o.b. price of canned Bartlett pears (in dollars per case),

X_2 is the domestic shipments of Pacific Coast canned Bartlett pears (in millions of cases),

X_3 is the index of nonagricultural income payments in the United States (in percentage points), and

X_4 is the adjusted index of prices of competing canned fruits (in percentage points).

The figures in parentheses are the standard errors of net regression coefficients.

The standard error of estimate, $\overline{S}_{1.234}$ = \$0.201 per case.

The adjusted coefficient of multiple correlation $\overline{R}_{1.234}$ = 0.968

With domestic shipments as the dependent variable, the multiple linear regression equation is

$$X_2 = -2.49468 - 1.61200\ X_1 + 0.07455\ X_3 + 0.04312\ X_4$$
$$\qquad\qquad\quad (0.54642) \qquad (0.03084) \qquad (0.02836)$$

The standard error of estimate $\overline{S}_{2.134}$ = 463,000 cases.

The adjusted coefficient of multiple correlation $\overline{R}_{2.134}$ = 0.652.

TABLE 1

Annual Average F.O.B. Prices of Pacific Coast Canned Bartlett Pears and Important Factors Affecting Them, 1926-27 to 1939-40

Year June through May	F.o.b. price canned Bartlett pears	Domestic shipments of canned Bartlett pears	Index of nonagricultural income	Adjusted index of prices of competing canned fruit
	1	2	3	4
	dollars per case	1,000 cases*	per cent	per cent
1926-27	4.31	1,957	101.1	99.5
1927-28	4.60	1,637	101.8	88.6
1928-29	4.13	2,170	105.5	86.8
1929-30	4.32	2,383	106.6	100.1
1930-31	3.53	2,617	94.0	89.6
1931-32	2.82	1,990	78.2	86.6
1932-33	2.48	2,200	63.0	95.4
1933-34	2.64	2,767	67.2	101.9
1934-35	3.05	2,984	73.7	104.7
1935-36	2.92	2,670	80.8	90.3
1936-37	2.92	3,997	92.2	80.8
1937-38	3.07	2,681	92.4	87.7
1938-39	2.77	3,114	89.2	75.7
1939-40	3.27	2,768	94.5	75.6

* No. $2\frac{1}{2}$ can basis.

Sources of data:

Col. 1: Compiled from reports by canners. Prices are weighted average prices received by canners, f.o.b. cannery or dock, for all grades and sizes of cans on an unadvertised basis. Regular brokerage, cash discount, swell allowance, and label allowance are included.

Col. 2: From table 3, column 7.

Col. 3: Simple average of the monthly indexes of nonagricultural income payments in the United States. See table 5.

Col. 4: For sources and method of construction, see table 4.

TABLE 1

Annual Average F.O.B. Prices of Pacific Coast Canned Bartlett Pears and Important Factors Affecting Them, 1928-29 to 1939-40

Year June through May	f.o.b. price canned Bartlett pears	Domestic shipments of canned Bartlett pears	Index of nonagricultural income	Adjusted index of prices of competing canned fruit
	1	2	3	4
	dollars per case	1,000 cases*	per cent	per cent
1928-29	4.31	1,807	101.1	99.5
1929-30	4.80	1,637	101.8	88.8
1930-31	4.15	2,170	105.8	86.8
1931-32	4.02	2,382	106.6	100.1
1932-33	3.65	2,417	94.0	89.6
1933-34	2.82	1,990	78.8	86.8
1934-35	2.48	2,200	83.0	98.4
1935-36	2.84	2,707	87.2	101.9
1936-37	3.03	2,984	93.7	104.7
1937-38	2.92	2,870	80.8	80.5
1938-39	2.92	3,307	92.2	80.8
1939-40	3.07	2,861	92.4	87.7
	2.77	3,114	88.2	78.7
	3.27	2,768	94.6	78.8

* No. 2½ can basis.

Sources of data:

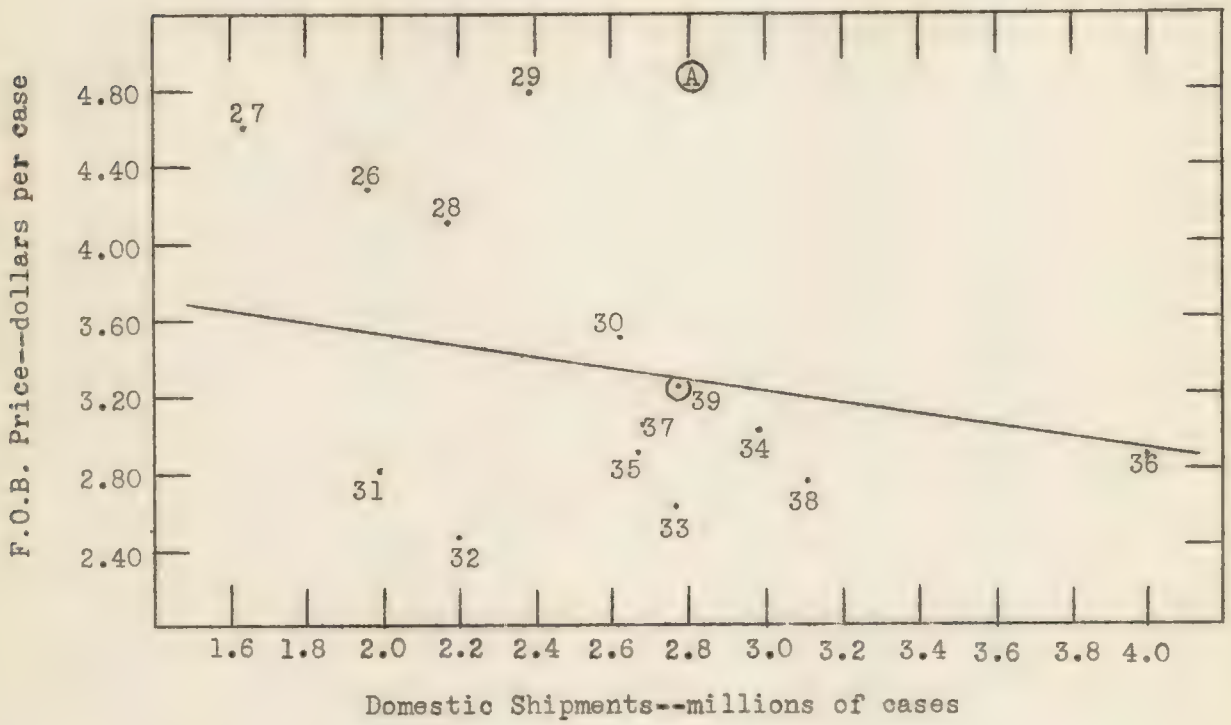
Col. 1: Compiled from reports by canners. Prices are weighted average prices received by canners, f.o.b. cannery or dock, for all grades and sizes of cans on an unadvertised basis. Regular brokerage, cash discount, usual allowances, and label allowances are included.

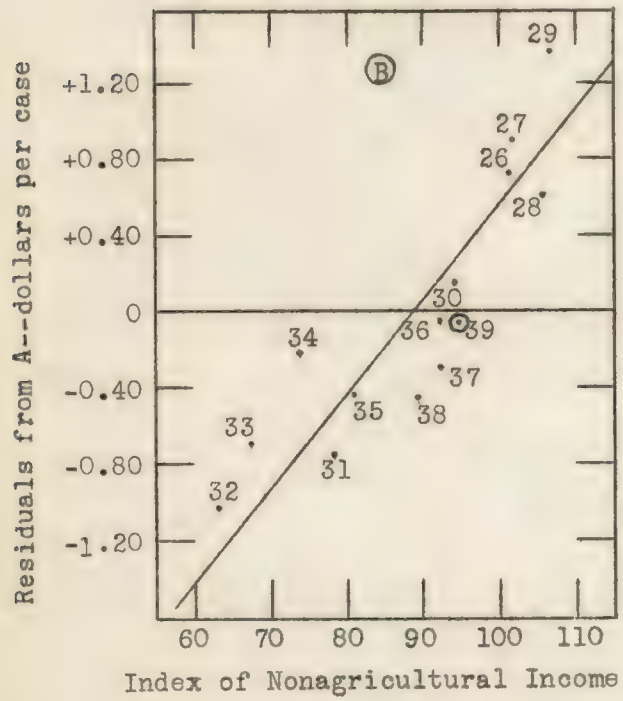
Col. 2: From table 5, column 7.

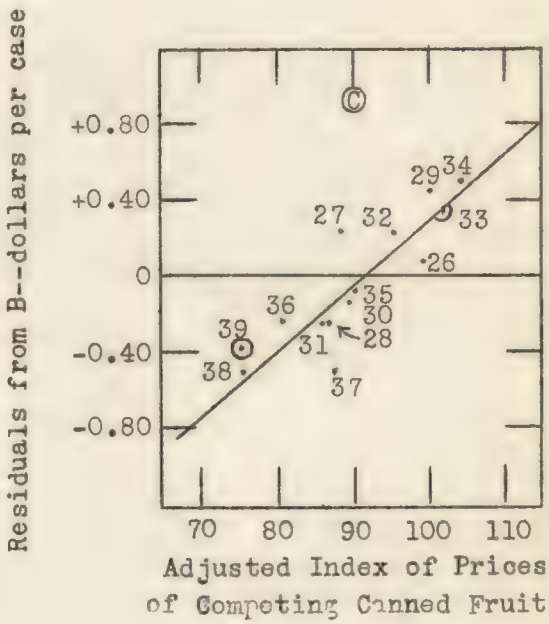
Col. 3: Simple average of the monthly indexes of nonagricultural income payments in the United States. See table 8.

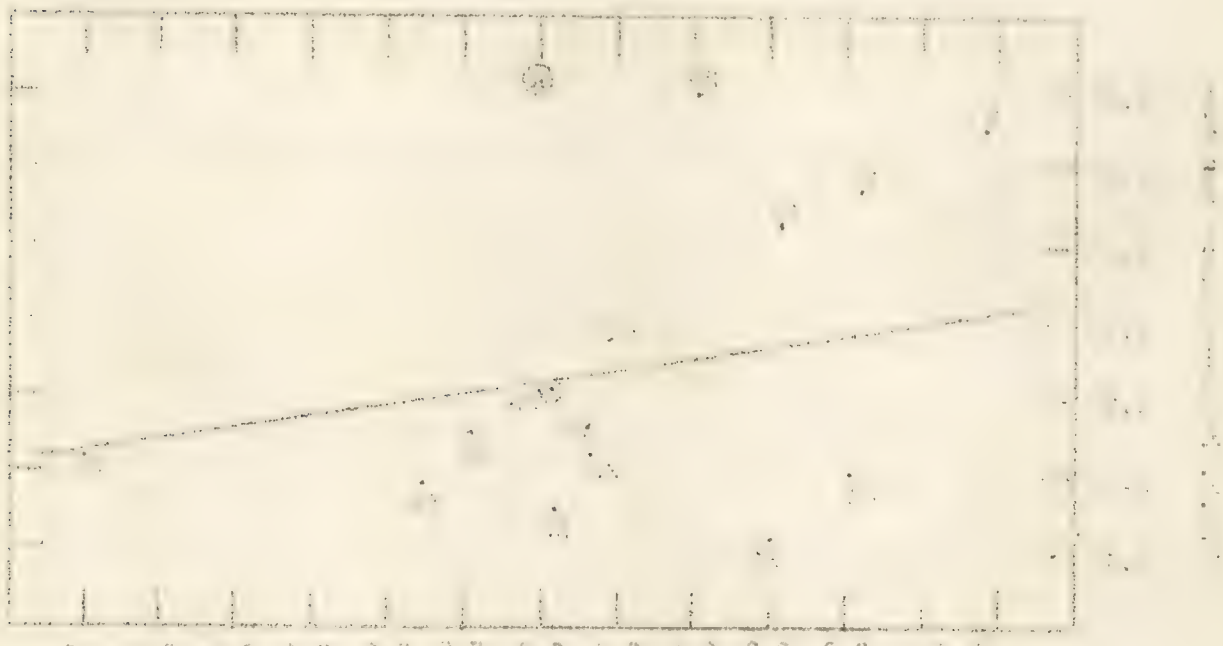
Col. 4: For sources and method of construction, see table 6.

Fig. 1--Pacific Coast Canned Bartlett Pears - Annual Averages F.O.B. Prices received by canners related to (A) domestic shipments of canned Bartlett pears, (B) index of nonagricultural income and (C) adjusted index of prices of competing canned fruits.









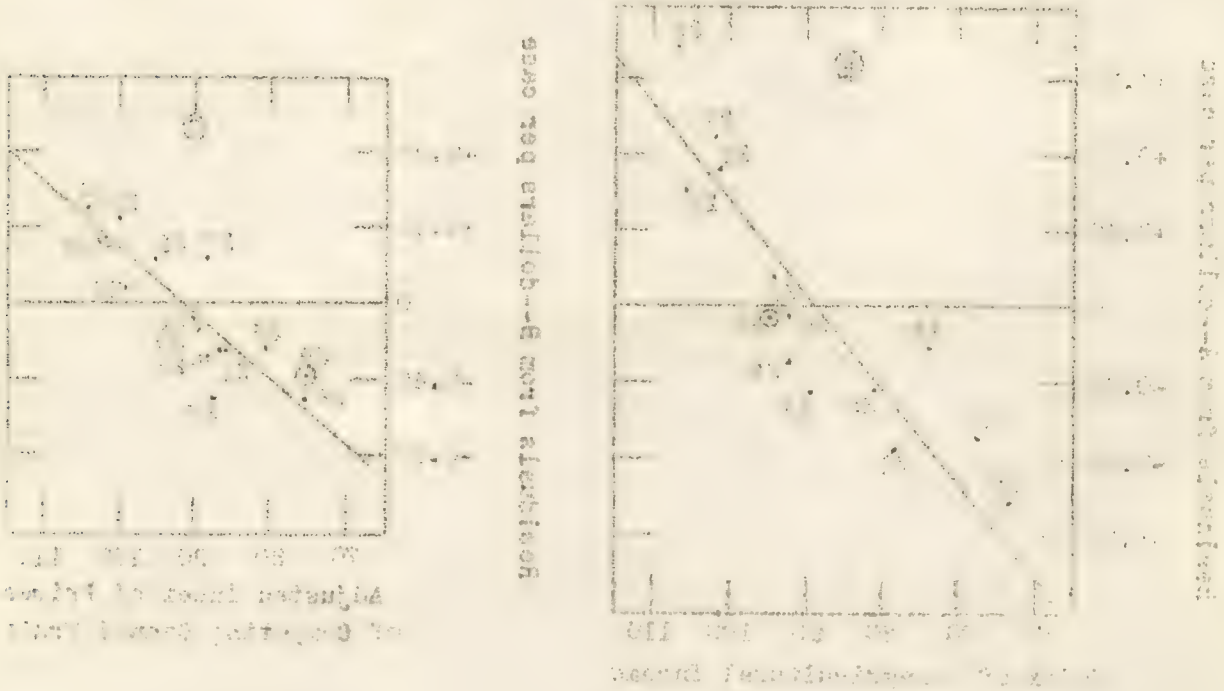


TABLE 2

Actual and Estimated F.O.B. Prices of Pacific Coast Canned Bartlett Pears, 1926-27 to 1939-40

Year June through May	Actual price	Estimated price	Column 1 minus column 2
	1	2	3
	dollars per case	dollars per case	dollars per case
1926-27	4.31	4.50	-0.19
1927-28	4.60	4.25	+0.35
1928-29	4.13	4.22	-0.09
1929-30	4.82	4.67	+0.15
1930-31	3.53	3.60	-0.07
1931-32	2.82	2.90	-0.08
1932-33	2.48	2.38	+0.10
1933-34	2.64	2.64	0.00
1934-35	3.05	3.00	+0.05
1935-36	2.92	2.95	-0.03
1936-37	2.92	2.78	+0.14
1937-38	3.07	3.44	-0.37
1938-39	2.77	2.73	+0.04
1939-40	3.27	3.09	+0.18

Sources of data:

Col. 1: From table 1, column 1.

Col. 2: Calculated from multiple regression equation, $X_1' = -3.4169 - 0.3049\ X_2 + 0.0500\ X_3 + 0.0348\ X_4$.

TABLE 3

Pack, Carryover, Shipments, and Exports of Pacific Coast Canned Bartlett Pears, 1926-27 to 1939-40

Year June through May	Pack	Carryover from previous year	Available for shipment	Carryover into following year	Shipments	Exports	Domestic shipments
	1	2	3	4	5	6	7
	1,000 cases*	1,000 cases*	1,000 cases*	1,000 cases*	1,000 cases*	1,000 cases*	1,000 cases*
1926-27	3,260	507	3,767	401	3,366	1,409	1,957
1927-28	2,639	401	3,040	167	2,873	1,236	1,637
1928-29	4,116	167	4,283	292	3,991	1,821	2,170
1929-30	4,206	292	4,498	952	3,546	1,163	2,383
1930-31	4,153	952	5,105	893	4,212	1,595	2,617
1931-32	3,635	893	4,528	870	3,658	1,668	1,990
1932-33	3,117	870	3,987	429	3,558	1,358	2,200
1933-34	4,377	429	4,806	273	4,533	1,766	2,767
1934-35	5,505	273	5,778	1,291	4,487	1,503	2,984
1935-36	4,230	1,291	5,521	957	4,564	1,894	2,670
1936-37	5,355	957	6,312	850	5,462	1,465	3,997
1937-38	4,321	850	5,171	1,150	4,021	1,340	2,681
1938-39	4,090	1,150	5,240	400	4,840	1,726	3,114
1939-40	4,057	400	4,457	280	4,177	1,409	2,768

* No. $2\frac{1}{2}$ can basis.

Sources of data:

Col. 1: Compiled from reports of Canners League of California and Northwest Canners Association. In some years data differ slightly from those previously published because different factors were used in converting actual cases to No. $2\frac{1}{2}$ equivalent cases.

Cols. 2 and 4: Compiled from reports released by Canners League of California and Northwest Canners Association. Carryovers for June 1, 1937, 1938, 1939, and 1940 were estimated from incomplete data. California and Pacific Northwest carryovers for June 1, 1926, 1927, 1928, 1929, and 1930 were converted from actual cases. Also Pacific Northwest carryover for June 1, 1932 was converted from actual cases.

Cols. 3, 5, and 7: Calculated.

Col. 6: Compiled from United States Department of Commerce, Monthly Summary of Foreign Commerce of the United States. Exports converted at 45 pounds per No. $2\frac{1}{2}$ equivalent case.

TABLE 4

Index of Prices of Canned Fruits Competing With Canned Bartlett Pears
1926-27 to 1939-40

Year June through May	Prices			Relatives of prices			Unadjusted index of prices of competing canned fruits	Index of nonagricultural income	Adjusted index of prices of competing canned fruits
	Canned clingstone peaches	Canned apricots	Canned pineapples	Canned clingstone peaches	Canned apricots	Canned pineapples			
	1	2	3	4	5	6	7	8	9
	dollars per case	dollars per case	dollars per dozen cans	1924-1929 = 100					
1926-27	3.66	3.85	2.35	99	100	103	100.6	101.1	99.5
1927-28	3.17	3.97	2.10	86	103	92	90.2	101.8	88.6
1928-29	3.22	3.67	2.20	87	95	96	91.6	105.5	86.8
1929-30	4.08	3.97	2.35	111	103	103	106.7	106.6	100.1
1930-31	2.88	3.32	2.10	78	86	92	84.2	94.0	89.6
1931-32	2.55	2.64	1.50	69	69	65	67.7	78.2	86.6
1932-33	1.97	2.23	1.60	53	58	70	60.1	63.0	95.4
1933-34	2.31	2.37	1.80	63	62	79	68.5	67.2	101.9
1934-35	2.69	3.47	1.80	73	90	79	77.2	73.7	104.7
1935-36	2.51	2.93	1.80	68	76	79	73.0	80.8	90.3
1936-37	2.66	2.75	1.80	72	71	79	74.5	92.2	80.8
1937-38	2.96	3.02	1.90	80	78	83	81.0	92.4	87.7
1938-39	2.30	2.55	1.71	62	66	75	67.5	89.2	75.7
1939-40	2.44	2.77	1.79	66	72	78	71.4	94.5	75.6

Sources of data:

Cols. 1 and 2: Compiled from reports by canners. Prices are weighted average prices for all grades and sizes of cans, f.o.b. cannery or dock, on an unadvertised basis.

Col. 3: Opening prices for No. 2½ Sliced Fancy Pineapple, Hawaii, as given in Western Canner and Packer, 1937 Yearbook, p. 85; 1937-38 to 1939-40 prices from California Fruit News, weekly issues.

Cols. 4, 5, and 6: Prices given in cols. 1, 2, and 3 in per cent of their 1924-29 averages -- canned clingstone peaches, $3.687; canned apricots, $3.848; canned pineapples, $2.292.

Col. 7: Weighted combination of relatives in cols. 4, 5, and 6 using following weights -- canned clingstone peaches, 8; canned apricots, 2; canned pineapples, 6.

Col. 8: From table 1, col. 3.

Col. 9: Col. 7 divided by col. 8.

TABLE 4

Index of Prices of Canned Fruits Competing With Canned Sardines, Maine
1929-30 to 1939-40

Year Runs Through May	Canned applesauce	Canned grapefruit	Canned pineapple	Canned peaches	Canned tangerine products	Canned pineapple	Unadjusted index of prices competing canned fruits	Index of consumer-buying power	Adjusted index of prices of competing canned fruits
	1/	2/	3/	4/	5/	6/	7/	8/	9/
	dollars per case	dollars per case	dollars per case				1929-30 = 100		
1929-30	3.26	3.45	2.30	90	1,240	1,005	109.8	101.4	99.5
1930-31	3.17	3.47	2.20	88	1,420	92	104.2	101.8	88.8
1931-32	3.22	3.47	2.20	87	1,280	88	98.8	106.5	78.8
1932-33	4.08	3.37	2.25	813	1,005	1,005	109.7	108.6	101.4
1933-34	3.88	3.26	2.20	78	1,320	82	96.0	94.0	90.8
1934-35	3.84	3.24	2.20	80	1,280	88	97.7	98.2	86.8
1935-36	3.87	3.23	2.20	82	1,280	90	99.3	96.0	95.4
1936-37	3.71	3.27	2.20	83	1,280	94	98.6	97.5	101.8
1937-38	3.69	3.27	2.20	79	1,280	98	99.8	98.7	104.1
1938-39	3.71	3.23	2.20	78	1,280	78	96.0	98.8	98.3
1939-40	3.66	3.15	2.20	78	1,280	78	94.8	98.2	98.8
1937	3.68	3.22	2.20	80	1,280	83	98.4	97.4	97.7
1938	3.80	3.28	2.21	82	1,280	88	99.2	97.2	98.5
1939	3.64	3.27	2.19	82	1,280	78	93.4	97.9	95.8

Sources of data:

Cols. 1 and 2. Compiled from reports by canners. Prices are weighted average prices for all grades and sizes of cans, f.o.b. cannery or dock, on an unrestricted basis.

Col. 3. Quoting prices for No. 1s Sliced Fancy Pineapple, Hawaii, as given in weekly Canner and Packer, 1937 Yearbook, p. 10; 1937-38 to 1939-40 prices from California Fruit News, weekly issues.

Cols. 4, 5, and 6. Prices given in cols. 1, 2, and 3 in per cent of their 1929-30 values -- Canned clingstone peaches, 85.0874; canned grapefruit, 93.6%; canned pineapple, 100.0%.

Col. 7. Weighted combination of relatives in cols. 4, 5, and 6 using following weights -- canned clingstone peaches, 8; canned grapefruit, 2; canned pineapple, 6.

Col. 8. From table 1, col. 2.

Col. 9. Col. 7 divided by col. 8.

TABLE 5

Nonagricultural Income Payments, United States, June 1932 to Date

(Seasonally corrected indexes, 1924-29 = 100)

Year	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June-May average
1932-33	66.6	65.2	64.6	64.2	64.2	63.5	63.3	62.8	62.1	60.2	59.6	60.2	63.0
1933-34	61.3	61.8	63.9	64.9	65.5	66.1	68.3	70.4	70.7	71.3	70.7	71.6	67.2
1934-35	71.6	72.1	72.6	71.5	72.5	73.2	73.5	74.9	75.6	75.5	75.9	75.6	73.7
1935-36*	75.8	76.2	77.3	78.1	79.0	79.8	81.1	82.7	83.6	84.6	85.1	86.1	80.8
1936-37*	87.2	88.3	89.7	90.3	91.6	92.4	93.0	92.9	93.8	95.1	95.7	96.4	92.2
1937-38	96.9	97.1	97.7	96.7	96.0	94.1	91.7	88.9	88.1	87.9	87.0	86.1	92.4
1938-39	86.1	86.2	88.0	88.3	89.0	89.8	90.3	90.6	90.6	91.1	90.0	90.5	89.2
1939-40	91.7	91.8	93.1	93.4	95.4	96.1	96.6	96.4	95.4	95.0	94.2	95.0	94.5

* Exclusive of veteran bonus payments. Bonus payments in other years were of little significance.

Sources of data:

June 1932-August 1939: United States Department of Agriculture Bureau of Agricultural Economics, mimeographed release of Nov. 16, 1939.

Sepgember 1939- : United States Department of Commerce, Survey of Current Business, monthly issues. To extend the monthly indexes forward, multiply the adjusted indexes of nonagricultural income payments reported on a 1929 base regularly in the Survey of Current Business, United States Department of Commerce, by 107.4 per cent.